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# SYSTEM AND METHOD FOR PROVIDING COMPUTER-BASED POSTAGE STAMPS

## 5 CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/239,424 filed October 10, 2000 and entitled "A SYSTEM AND METHOD FOR PROVIDING COMPUTER BASED POSTAGE STAMPS" the contents of which are hereby incorporated by reference as if  
10 set forth in full herein.

## BACKGROUND

A significant percentage of the United States Postal Service (USPS) revenue is from metered postage. Metered postage is  
15 generated by utilizing postage meters that print a special mark, also known as postal indicia, on mail pieces. Generally, printing postage and any other value bearing item (VBI) can be carried out by using mechanical meters or computer-based systems. Conventionally, a business or other entity will have a meter at  
20 its place of business, and will use the meter to print postal indicia on mail pieces or on labels that are then affixed to the mail pieces.

With respect to computer-based postage processing systems, the USPS under the Information-Based Indicia Program (IBIP) has  
25 published specifications for IBIP postage meters that identify a special purpose hardware device, known as a Postal Security Device (PSD) that is generally located at a user's site. The PSD, in conjunction with the user's personal computer and printer, functions as the IBIP postage meter. The USPS has published a  
30 number of documents describing the PSD specifications, the indicia specifications and other related and relevant information.

Currently, one of the standards required by the USPS is that  
35 the address of the intended recipient of a piece of mail be verified by comparing the entered address with a database of

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valid addresses provided by the USPS. Conventionally, this  
requires that the sender have the database installed on their  
local computer and compare the intended destination address with  
5 the addresses in the database. Therefore, while conventional  
computer-based postage systems allows a user to print a postal  
indicium at home, at the office, or any other desired place for  
a particular mail piece with an intended recipient, such systems  
do not allow the printing of postal indicia onto labels or other  
10 print media for future use on any mail piece with a presently  
unidentified recipient.

Therefore, it would be advantageous to provide a system and  
method for printing postal indicia that does not require address  
matching or mailing on a particular date, for use on mailpieces  
15 in a manner similar to standard stamps.

#### SUMMARY OF THE INVENTION

20 The present invention provides for the creation of computer-  
based postage that may be used in a manner similar to standard  
postage issued by the USPS. In a presently preferred embodiment,  
the intended address of the recipient need not be verified at the  
time the postage is created. Rather the postage may be used at  
any time in the future with any recipient.

25 In one aspect of the present invention, a method is provided  
for printing postage to be used on any date and with any  
recipient. The method includes providing label stock including  
a master serial number. A computer system receives from a user  
the master serial number and a postage request. The computer  
generates an indicium using the master serial number and the  
30 postage request. The computer then prints the postage using the  
indicium and the label stock.

35 In another aspect of the invention, the label stock further  
includes anti-fraud devices. The anti-fraud devices may include  
micro-printing, watermarks, the use of phosphorescent ink, and  
color changing ink on the label stock.

1 In another aspect of the invention, the postage request includes a postage amount, a postage class, and an identification of a Licensing Postage Office.

5 In another aspect of the invention, the label stock includes a pre-printed serial number. The computer generates an indicium including the pre-printed serial number.

10 In another aspect of the invention, the master serial number is linked by the computer to a specific postage printing device. Once the master serial number and the specific printing device are linked, generation of the indicium further includes ensuring the master serial number is used with the specific postage printing device

15 In another aspect of the present invention, a method for creating computer-based postage that may be used on any date and with an undetermined addressee includes generating a request to print postage, determining the means for generating the request, determining the master serial number for label stock, tracking the master serial number and printing the postage.

#### 20 BRIEF DESCRIPTION OF THE DRAWINGS

25 These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

FIG. 1 is a block diagram of an Internet client/server environment used by an on-line postage system in one embodiment of the present invention;

30 FIG. 2 is a flow chart of the operation of an exemplary system for generating computer-based postage in accordance with an exemplary embodiment of the present invention;

FIG. 3 is a screen shot of a suitable user interface to allow a user to enter postage information in a free format accordance with an exemplary embodiment of the present invention;

FIG. 4 is a screen shot of a postage calculator interface to allow a user to calculate the postage for a particular mail piece in accordance with an exemplary embodiment of the present invention;

FIG. 5 is a plan view of a void Computer-based postage stamp in accordance with an exemplary embodiment of the present invention;

FIG. 6 is a plan view of a computer-based postage stamp in accordance with an exemplary embodiment of the present invention;

FIG. 7 is a screen shot of a suitable user interface to allow a user to enter the serial number of a label sheet or roll of labels in accordance with an exemplary embodiment of the present invention;

FIG. 8 is a screen shot of a suitable user interface to allow a user to enter a master serial number of sheet label stock or roll label stock in accordance with an exemplary embodiment of the present invention;

FIG. 9 is a screen shot of a suitable user interface to allow a user to quickly print postage using roll label stock in accordance with an exemplary embodiment of the present invention;

FIG. 10 is a screen shot of a suitable user interface to allow a user to quickly print postage using sheet label stock in accordance with an exemplary embodiment of the present invention; and

FIG. 11 is a screen shot of a suitable user interface to allow a user to view a history of printed postage in accordance with an exemplary embodiment of the present invention.

#### DETAILED DESCRIPTION

An exemplary embodiment of the present invention enables computer-based postage systems to print postal indicia (computer-based postage stamps) that may be mailed on any current or future date, to any recipient. An example of a computer-based postage system is a software-based, on-line postage system described in

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U.S. Patent Application No. 09/163,993 filed on September 29,  
1998, by Mohan Ananda, entitled "On Line Postage System", the  
contents of which are hereby incorporated by reference as if set  
forth in full. The on-line postage system software comprises  
user code or client software that resides on a client system and  
controller code that resides on a server system. An exemplary  
online postage system may comprise a user system electronically  
connected to a server system, which in turn is connected to a  
USPS system. The server system is preferably capable of  
communicating with one or more client systems simultaneously.

In operation, a licensed and registered client of the on-  
line postage system sends a request for authorization to print  
a desired amount of postage. A postal security device (PSD)  
server determines whether the client's account balance is  
sufficient to cover the requested amount of postage, and if so,  
communicates an authorization to the client system. The client  
system then sends image information for printing a postal  
indicium for the granted amount to a printer so that the postal  
indicium is printed on the print media, such as for example a  
label. Once the postage information is printed on an individual  
label it may be subsequently placed on an individual mail piece  
with a recipient of the users choosing and mailed and processed  
by the USPS.

In one embodiment, the PSD package preferably includes  
ascending and descending registers (the ascending register "AR"  
records the amount of postage that is dispensed or printed on  
each transaction and the descending register "DR" records the  
value or amount of postage that may be dispensed and decreases  
from an original or charged amount as postage is printed). A  
preferred PSD may further include a device ID, indicia key  
certificate serial number, licensing ZIP code, key token for the  
indicia signing key, date and time of last transaction, the last  
challenge received from the client, the operational state of the

1 PSD, expiration dates for keys, the passphrase repetition list and the like.

5 FIG. 1 shows a block diagram of an exemplary client/server environment used by an on-line postage system in accordance with one embodiment of the present invention. Clients 10a-10n and server 20 engage in two-way communication over a suitable communication network 12. In one embodiment, communication network 12 comprises the Internet. It will be understood by those skilled in the art that the communication network may take many different forms, such as a local area network (LAN), wide area network (WAN), wired telephone network, wireless network, or any other network that supports data communication between respective entities.

10 The clients 10a-10n may take many different forms, and in one illustrative embodiment comprise personal computers and printer, with the personal computers being linked to a PSD. Alternatively, the clients 10a-10n may comprise computers or any other device that has processing capabilities and that may engage in communication over communication network 12. Clients 10a-10n may be connected to the communication network 12 through communication links 14a-14n. In addition, each client preferably has access to a printer such as printer 16. Optionally, a local network 18 may serve as the connection between some of the clients, such as the PC 10a and the Internet 12. Servers 20a-20m are also connected to the Internet 12 through respective communication links.

15 Referring now to FIG. 2, the basic operation of an exemplary computer-based postage system for printing computer-based postage stamps is described in more detail. Operation begins at step 100, with a user entering a request to print the desired postage. Conventional non PC postage stamps correspond to the postage class of the particular mailpiece, typically first class. However, there are special stamps available that are designed especially for priority and express mail services. Therefore,

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an exemplary computer-based postage system preferably provides  
a plurality of interfaces from which a user may print computer-  
based postage stamps for use with standard first class service  
5 as well as other speciality services. For example, as shown in  
FIG. 3, an exemplary user interface 102 preferably provides  
wizard based prompts to assist users in determining the  
type/class of postage to print. In addition, a second power  
10 interface is preferably available that allows customers to simply  
enter the postage rate and print computer-based postage stamps.

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An exemplary user interface preferably includes a window 104  
into which the user may enter postage information, such as for  
example, \$0.33 for first class stamps, in a free form. The user  
interface also includes a link 104 to a postage calculator that  
may be used to calculate postage for specialty services such as  
for example Express mail. An exemplary postage calculator as  
shown in FIG. 4, preferably includes a plurality of toggle  
20 buttons 106 that allow a user to select the mail class or  
specialty service for which postage is being printed. In  
addition, the calculator preferably includes a drop down box that  
allows a user to select a book rate 108 or the type 110 of mail  
piece to be sent, such as for example, a letter, flat, box or  
oversized box.

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An exemplary postage calculator preferably allows a user to  
enter the weight of an item to be mailed into weight fields 112A,  
112B. The dimensions of the weight fields may be for example  
pounds and ounces. An exemplary on-line postage system  
preferably allows users to integrate a digital scale into the  
postage system. The print postage screen preferably provides an  
30 interface to the digital scale. A scale button 114 on the print  
postage screen preferably allows for the automatic retrieval of  
the weight of the mail piece from the scale. The system  
preferably displays this weight in the enter weight fields 112A,  
112B. A default weight is preferably 0 lbs., 1 oz. After the  
35 initial use, the fields preferably remember the last value.

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An exemplary postage calculator further provides windows 116 and 118 in which a user may enter the destination and origin zip codes respectively. The destination and origin zip codes are active after a weight that warrants zone based postage has been entered. A cost of mailing dialog box 120 preferably appears when multiple recipients are selected. The cost of mailing dialog box 120 preferably displays the total cost for the mailing.

10 Referring back to FIG. 2, in the described exemplary embodiment, the indicia generation process preferably determines whether the print wizard was used to generate the request to print computer-based postage stamps 130. If the print wizard was used to generate the request the class selected within the wizard will be the class included in the computer-based postage stamps. If the wizard was not used, the rate class will default to first class. In an exemplary embodiment of the present invention, a user may select any denomination of postage desired, up to the maximum limit defined by the PCIBI-O, that is currently \$999.99.

20 An exemplary system preferably utilizes special paper label stock to protect against the fraudulent production of computer-based postage stamps. The paper label stock may be available through the computer-based postage service provider, through retail outlets or other sources. In one embodiment of label stock in accordance with the present invention, multiple labels are placed on a single large sheet of label stock. The multiple labels may be arranged in any fashion. In one embodiment of a label sheet in accordance with the present invention, the labels are arranged in a rectilinear grid pattern. In another embodiment of label stock in accordance with the present invention, multiple labels are arranged in a linear fashion placed on a roll of label stock.

30 In accordance with an exemplary embodiment of the present invention a serial number uniquely identifies a label used to generate a postage stamp. Such a label is herein termed a



1 Postagio label. An exemplary system may determine the label  
serial number 132 by way of the master serial number entered by  
a user in a window 134 of the indicia print interface (see FIG.  
5 3). The master serial number is a manufacturer serial number  
that is used to track the production, distribution, and use of  
a particular unit of label stock. An exemplary system preferably  
prints computer-based postage stamps having a pre-printed serial  
number that matches a serial number on a Postagio label. As an  
10 added security measure, the pre-printed serial number on the  
Postagio label will be based on the master serial number for  
label stock. In one embodiment of a pre-printed serial number  
in accordance with the present invention, the master serial  
number is included as the leading 3 digits in a pre-printed  
15 serial number. This allows a customer to reuse a partial sheet  
of label stock, reducing waste while maintaining the secure  
nature of the paper.

An exemplary embodiment of the present invention preferably  
uses alphanumeric serial numbers, generated from a 28-character  
20 set. The alphanumeric serial numbers will be broken up visually  
for the customer to reduce data entry errors. The master serial  
number will contain a checksum value and will help prevent  
incorrect sheet values. In operation when a user prints  
computer-based postage stamps an exemplary system preferably  
25 prints a serial number as part of the indicia just above the pre-  
printed serial number already on the label. In a preferred  
embodiment the printed serial number is the same font and size  
as the pre-printed number on the label. This allows for immediate  
comparison of the numbers by USPS personnel.

30 In addition, a special serial number, such as for example,  
LLL.LLL.LLL.LLL will be reserved for use by QA and will not be  
tracked or restricted from reuse in any way. Entry of this value  
will bypass the checksum validation. If a user enters this  
serial number inadvertently, the indicium will be generated and  
35 their account will be debited. However, the printed serial number

1 will not match the label serial number. This will require USPS intervention to recognize that the serial numbers do not match

5 In the described exemplary embodiment, master serial numbers and pre-printed serial numbers are tracked on the server 135. When a unit of label stock has been used, the server flags the meter number that used label stock. If the user prints computer-based postage stamps on a portion of label stock, the user will be able to print indicia on the remaining labels included in the label stock at a later time. However, only the meter that initially used the label stock will be permitted to print the remaining labels. Once all labels included in the label stock have been printed, the associated master serial number and pre-printed serial numbers will be flagged and any attempts to print a label using those serial numbers will be rejected by the server. A preferred embodiment will not activate all possible serial numbers. Rather, only label stock and labels having serial numbers that have been produced by a manufacturer and placed into distribution will be active and available for use.

20 A user may print 136 postage or sample postage onto the label stock. Referring to FIG. 3, the user may print sample postage by selecting a print sample postage radio button 140. Therefore, an exemplary computer-based postage system preferably includes void computer-based postage stamps as sample postage for use in printer verification tests. An example of a void computer-based postage stamp is shown in FIG. 5. An exemplary postage system may utilize a serial number outside the character set reserved for actual postage, such as for example, ZZZ.ZZZ.ZZZ.ZZZ.## as the serial number for void indicia.

30 Referring back to FIG. 3, the user may print an actual computer-based postage stamp by selecting a print postage radio button 142. An exemplary computer-based postage stamp is preferably different from indicia currently in use for IBIP to allow USPS personnel and customers to instantly recognize and distinguish the computer-based postage stamps. However, the

1 computer-based postage stamp preferably also guards against fraud. Therefore, an exemplary Postagio indicium preferably utilizes a data matrix barcode format.

5 Referring to FIG. 6, an exemplary computer-based postage stamp includes multiple pieces of information, some pre-printed and some printed at the time of indicia creation, to ensure the uniqueness of the stamp and ease of processing. For example, an exemplary indicia includes the postage amount 10 200 displayed in the upper left-hand corner of the indicia. The postage amount is preferably displayed using the largest font size permitted given the size of the label and the indicium. The large font size helps ensure that USPS 15 personnel can quickly identify the stamp value. In addition, an exemplary system preferably prints "US Postage" 202 under the postage amount, preferably, in a slightly smaller font than the postage amount. The term US Postage helps ensure that the stamp is identified as being domestic in origin. Further the indicia preferably identifies the mail class 204 20 served by the stamp and may include relevant information regarding the stamps origination such as for example the LPO 206 or Licensing Post Office.

25 A computer-based postage stamp may further include a pre-printed serial number 208. The pre-printed serial number is a unique number printed on the bottom left-hand corner of the label to identify the sheet source and the individual label number. An exemplary system further encodes the pre-printed serial number in the indicium 210 to ensure that the stamp is unique. In addition, a serial number will also be printed 212 30 at the time the Postagio is created. This will be printed directly above the pre-printed serial number as an added fraud deterrent. If the serial numbers do not match each other and the serial number in the indicium, then the computer-based postage is not valid. The computer-based postage stamp may 35 further include the logo 214 of the computer-based postage

1 provider. The logo may be pre-printed on the label. In one  
embodiment the label stock preferably features the provider  
logo as a means to guarantee that the label stock meets the  
5 necessary security requirements.

In the described exemplary embodiment, the labels may  
also include various anti-fraud features to guard against the  
fraudulent production of computer-based postage stamps. For  
example, the label stock preferably uses phosphorescent ink.  
10 This type of ink is considered a specialized material that is  
not readily available to the general public, ensuring the  
security of the label stock. Therefore, in one embodiment  
each Postagio label is coated with a phosphorescent ink. The  
phosphorescence will also assist the USPS automated handling  
equipment in identifying the stamp. In addition, the  
computer-based postage stamps will preferably be cut with a  
special die to further ensure the security of the Postagio  
labels. In one embodiment of a special die in accordance with  
the present invention, the cutting edges of the die do not  
20 follow a straight line. Instead the cutting edges are  
composed of a sequence of specially angled lines.

The label stock may further include watermark printing in  
the form of a printed background graphic (preferably in that  
range of about 10-20% color saturation). The watermark  
printing is visible to the eye and not easily reproduced. The  
25 watermark in one embodiment is represented by a flag emblem,  
as shown in the sample indicia illustrated in FIG. 5.

The Postagio label stock may further include micro-  
printing that is invisible to the naked-eye, but can be seen  
under a microscope. The micro-printing provides an additional  
security measure, since it cannot be easily reproduced. In a  
preferred embodiment the micro-printing is limited to the  
space to the left of the indicium. The micro-printing  
preferably reads "US Mail / The name of the service provider".  
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In addition, the service provider's logo may be printed

1 on each Postagio label. The logo helps ensure that an  
authorized vendor designated by both the service provider and  
the USPS created the label. In addition, it will help the  
5 USPS to quickly identify the product that created the  
Postagio. Finally as previously described a pre-printed  
serial number with thermally sensitive color-changing ink,  
known as thermochromatic ink, may be included on the Postagio  
label stock. The serial number uniquely identifies the  
10 Postagio label. In one embodiment, the serial number on the  
label must match the number printed by the service provider as  
well as the number in the indicium. The color-changing ink  
ensures that a designated vendor created the Postagio label.

15 The Postagio label stock preferably does not use optical  
brightening agents, to prevent a reaction under black light.  
In addition, different color paper may be offered, possibly  
including white, ivory, blue, pink, peach, and gray. All paper  
will be tested to ensure compliance with the anti-fluorescent  
20 requirements and to ensure that the indicia is still easily  
scannable. Colors will preferably have a maximum saturation in  
a range of about 10-30% saturation. In addition, the label  
design preferably accounts for print engine tolerance in  
placement of specific elements.

25 FIG. 7 and FIG. 8 are screen shots of a suitable user  
interface allowing a user to enter the master serial number of  
a sheet or roll of label stock in accordance with an exemplary  
system for generating computer-based postage in accordance  
with the present invention. FIG. 7 is a screen shot of a  
30 suitable user interface to allow a user to enter a printer  
type in accordance with an exemplary embodiment of the present  
invention. The printer type will determine whether sheet  
label stock or roll label stock is being used. A user uses  
the printer type field 300 to enter a printer used to print  
35 postage. The user uses the printer type button 302 to  
generate a printer type menu (not shown) with selectable names

1 of supported printer types. In operation, the user selects  
the printer type button to generate the printer type menu.  
The user selects a printer type from the printer type menu.  
5 The printer type menu is dropped and the printer type selected  
by the user is shown in the printer type field. Once entered,  
the printer type is retained for future reference. The user  
selects a "next" button 304 to advance to the next serial  
number entry user interface screen. In the case where the  
10 user selects a printer type indicating that roll label stock  
is being used, a blank stamp is issued from the printer 16  
(FIG. 1) when the "next" button is selected. The user may  
then reference the issued blank stamp for subsequent data  
entry tasks.

15 FIG. 8 is a screen shot of a suitable user interface to  
allow a user to enter the serial number of sheet label stock  
or roll label stock in accordance with an exemplary embodiment  
of the present invention. In the case that a printer type  
using roll label stock was selected by the user in the  
20 previous user interface screen, the user interface includes an  
instruction message 400 telling the user to examine the blank  
stamp that was issued from the printer 16 (FIG. 1). The blank  
stamp includes a pre-printed serial number from which the  
master serial number for the entire roll of label stock may be  
25 determined. The pre-printed serial also includes a label  
sequence number 404 that identifies the label's sequence in  
the roll of label stock. The user reads the pre-printed  
serial number from the stamp and enters the serial number into  
the serial number entry field 402. In the case where the user  
30 is using label stock in sheet form, the user simply reads a  
pre-printed serial number from one of the labels on the sheet  
label stock. The exemplary system for generating computer-  
based postage uses the entered serial number for subsequently  
printing postage as previously described. In an embodiment of  
35 an exemplary system for generating computer-based postage in

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accordance with the present invention, the entered serial  
number is validated by checking the pre-printed serial number  
against a database of valid pre-printed serial numbers and  
5 also by checking the type of the label stock associated with  
the pre-printed serial number.

FIG. 9 is a screen shot of a suitable user interface to  
allow a user to quickly print postage using a roll of label  
stock in accordance with an exemplary embodiment of the  
10 present invention. A user selects a printer type selection  
button 502 to generate and display a printer type menu (not  
shown). The printer type menu includes a list of selectable  
printer types. The user selects a printer type from the menu  
and the printer type menu is dropped. The selected printer  
15 type determines the label stock type as shown in label stock  
type field 502. Additionally, an exemplary label 504 is shown  
within the user interface confirming the user's choice of  
label stock. The user enters a start number in a start number  
entry field 506 and the number of labels to print in a number  
20 of labels entry field 508. The user enters the amount of  
postage to print on each label in a postage entry field 510.  
The total amount of postage to be printed is calculated and  
displayed in a total postage cost field 512.

If the user does not know how much postage is needed, the  
25 user may use a postage calculator 514 included in the user  
interface to calculate the correct amount of postage. To use  
the postage calculator, the user selects a mail piece type  
using the mail piece type entry field 516. The user then  
enters the weight of the mail piece using weight entry field  
30 518. In one embodiment of an exemplary system for generating  
computer-based postage, the user can select a scale button 520  
to automatically enter the weight of a mail piece as the mail  
piece is weighed on a digital scale. The user selects the  
mail class of the mail piece using a mail class entry field  
35 522. Finally, the user enters a ZIP code to which the mail

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piece is being sent in a ZIP code entry field 524. Once all  
of the previously described information is entered, a postage  
amount is calculated and displayed in the previously described  
5 total postage cost field 512.

To print postage, the user selects a print labels button  
514. Alternatively, the user can print a voided sample label  
by selecting a print sample button 516.

10 FIG. 10 is a screen shot of a suitable user interface to  
allow a user to quickly print postage using a sheet of label  
stock in accordance with an exemplary embodiment of the  
present invention. The operation of this user interface is  
the same as the previously described roll label stock  
interface. However, if a user selects a printer type using  
15 sheet label stock instead of roll label stock, two additional  
buttons are made available to the user. A user selects a  
full sheet button 600 to print postage onto a full sheet of  
labels.

20 The user may also select a partial sheet button 602 to  
print postage on a partial sheet of labels. In this case, the  
user enters a starting number for the labels in a start number  
entry field 604 and the number of labels to print in a number  
of labels field 606. When the user selects the partial sheet  
button and enters a start number in the start number entry  
25 field, a sheet label stock display 701 is generated showing  
labels that will be printed. The sequence numbers 608 of the  
printable labels on the sheet label stock are shown in the  
sheet label stock display. Those labels that will not be  
printed are shown as blank labels 610.

30 FIG. 11 is a screen shot of a suitable user interface to  
allow a user to view a history of printed postage in  
accordance with an exemplary embodiment of the present  
invention. A user selects a view reports tab 700 to generate  
a printed postage history display 702. The printed postage  
35 history display includes printed postage histories displayed



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in interactive columns. The user selects an interactive  
column in order to sort the printed postage display using the  
values in the interactive column. The interactive columns  
5 include a date column 704, a mail class column 706, a postage  
amount column 708, a weight column 710, and a destination  
column 712. The user uses the printed postage history display  
to track the amount of printed postage over time.

10 Although a preferred embodiment of the present invention  
has been described, it should not be construed to limit the  
scope of the appended claims. For example, the present  
invention may be implemented by a variety of computer-based  
postage metering systems in accordance with a variety of print  
requirements promulgated by postal systems around the world.  
15 Further, although the operation of the present invention has  
been demonstrated in accordance with USPS requirements for PC  
based postal printing, the present invention is not limited to  
applications in accordance with the USPS requirements. Rather,  
the present invention is equally applicable for operation in  
20 all PC postal printing systems.

25 In addition, those skilled in the art will understand  
that various modifications may be made to the described  
embodiment. Moreover, to those skilled in the various arts,  
the invention itself herein will suggest solutions to other  
tasks and adaptations for other applications. It is therefore  
desired that the present embodiments be considered in all  
respects as illustrative and not restrictive, reference being  
made to the appended claims rather than the foregoing  
description to indicate the scope of the invention.  
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